

Amendments to the Claims:

The following Listing of Claims replaces all prior versions and listings of the claims in this application.

Listing of the Claims:

1. (cancelled)
2. (currently amended) The system of claim 21 in which the ~~program comprises~~ control system includes inputted parameters, the parameters determining for each ~~selected spot~~ target area, the amount of power, the amount of time, and the characteristics of the catalyst sample material type to be deposited ~~by the plasma gun on the target area~~.
- 3-7. (cancelled)
8. (currently amended) The system of claim 21 in which the substrate assembly is configured for bearing a planar substrate having a plurality of target areas thereon ~~multiple separately defined selected spots of the substrate are~~ arranged in ~~the~~ a matrix defined by columns and rows.
9. (currently amended) The system of claim 8 ~~in which a number (N) of separately defined spots in the rows and a number of separately defined spots (N) in the columns is rows N = columns N~~ wherein the matrix comprises an equal number of columns and rows of target areas.
10. (currently amended) The system of claim ~~8~~ 9 in which a the relationship of the a number ~~(N)~~ of separately defined ~~spots~~ target areas in one column ~~(N)~~ to the number of separately defined ~~spots~~ target areas in an adjacent column is: ~~spots target areas~~ in column N = N X and ~~spots target areas~~ in adjacent column N+1 = N+1 X+1.
11. (currently amended) The system of claim 8 in which a the relationship of the a number ~~(N)~~ of separately defined ~~spots~~ target areas in one row ~~(N)~~ to the number of separately defined ~~spots~~ target areas in an adjacent row is: ~~spots target areas~~ in row N = N X and ~~spots target areas~~ in adjacent row N-1 = N-1 X-1.

12. (cancelled)

13. (currently amended) The system of claim 8 21 wherein the substrate assembly comprises a side surface of a block ~~positioned within the central location of the chamber, the block having a multiplicity configured for maintaining a plurality~~ of cylindrical substrate elements ~~extending from the side surface thereof~~, each cylindrical substrate element individually defining a ~~selected spot~~ target area, the cylindrical substrate elements maintained in an array of columns and rows formed within the block, in which upper surfaces of the cylindrical substrate elements comprise the ~~discrete spots~~ target areas on which catalyst samples are deposited ~~exposed to the sources~~.

14. (previously presented) The system of claim 13 in which the cylindrical substrate elements are inset within the block in the matrix and a plate having a plate matrix of openings concentric with the matrix of elements in the block is applied facing the surface of the block, such that the openings in the plate are aligned with the elements and a cross-section area of an opening in the plate is less than a cross-section area of the surface of the corresponding concentric cylindrical element.

15. (currently amended) The system of claim 21 in which, the ~~program control system is configured to select~~ includes selection of 1) an ion emitted by each plasma gun within a cluster; 2) the amount of power and the duration of operation for the gun; and 3) the position of the substrate assembly, such that each ~~selected spot~~ target area ~~of the substrate~~ is exposed to the plasma gun at the selected power and at the selected duration.

16. (currently amended) The system of claim 21 wherein ~~multiple guns are arranged in each of multiple clusters and the~~ catalyst materials are deposited on the ~~sample spots~~ target areas in layers in a programmed number of cycles.

17. (cancelled)

18. (currently amended) The system of claim 21 wherein values from an actual sample ~~spot~~ catalyst material created at a set power, time and composition are compared to expected values

and the programmed parameters for power, time and composition for that sample spot catalyst material are adjusted if the actual spot catalyst material values vary from the expected values..

19. (currently amended) The system of claim 21 in which the control system positions the substrate assembly and selects certain plasma guns and controls the amount of power and the duration of operation of the guns in essentially the same operation such that different catalyst materials from each gun are co-deposited with respect to a given sample spot target area on the substrate.

20. (currently amended) The system of claim 21 in which the control system positions the substrate assembly and selects certain plasma guns and controls the amount of power and the duration of operation of the guns in essentially the same operation such that different catalyst materials from each gun are deposited as layers with respect to each sample spot target area on the substrate.

21. (currently amended) A physical vapor deposition apparatus system for depositing combinatorial catalyst samples materials on a plurality of substrate target areas sample spots arranged on a substrate comprising:

(a) a deposition chamber that when open, receives the one or more substrates and is sealable after the one or more substrates is are loaded therein upon a moveable central shaft that is vertically positioned at the center of the chamber, the chamber being openable after the one or more substrates have been is processed so that the one or more substrates with the sample spots deposited catalyst samples can be removed therefrom;

(b) a plurality of plasma sources radially disposed within the chamber, the plasma sources for depositing catalyst samples materials as sample spots on the target areas of the one or more substrates in a predetermined matrix in accordance with coordinates defined by a program, wherein each of the plasma sources each comprising comprises a cluster of separately controllable, co-focused plasma guns, each gun of a cluster configured for depositing, according to the program, a predetermined catalyst material onto a substrate target area aligned with the cluster;

(c) a substrate assembly for controllably and selectively positioning one or more substrates within the deposition chamber in order to selectively and sequentially align each of the target areas of the one or more substrates with one of said clusters of plasma guns, said substrate assembly rotationally and planarly moveable within the deposition chamber for aligning each of the target areas; and

(ed) a control system programmably controlling the operation of each gun and the movement of the substrate assembly for alignment of the target areas with the clusters of plasma guns; shaft according to the program, the control system providing controlling (i) an the amount of power to each gun to regulate a rate of catalyst material deposition, (ii) an the amount of time of deposition for each catalyst material to be deposited at on a selected sample spot target area, and (iii) an z, x and y coordinate position of the shaft, wherein, z defines axial rotation coordinates that align the sample spot rotational movement of the substrate assembly in order to align the substrate assembly with one of the radially disposed plasma sources clusters of plasma guns, * defines vertical coordinates that and (iv) planarly movement of the substrate assembly, in both x and y directions, in order to align an individual target area of a substrate align the sample spot with the same plasma source cluster of plasma guns such that the plasma guns of that cluster are co-focused on the aligned target area, and y defines a horizontal coordinates that align the sample spot with the same plasma source, each such alignment occurring when the plasma guns in the plasma source are sequentially focused upon each sample spot as the substrate is positioned, and remains at a fixed position for a pre-set period, to create individual sample spots.

22. (currently amended) The system of claim 21 in which the control system positions the substrate assembly, selects the guns, and controls the amount of power and the duration of operation of the guns, such that different catalyst materials from the guns are applied to a given sample spot target area in at least one of a layer or a co-deposition.

23. (currently amended) The system of claim 22 wherein each of the catalyst materials is a metal and the control system is configured for despositing catalyst samples spot comprises comprising multiple layers with a single metal in each layer.

24. (currently amended) The system of claim 22 ~~having layers~~ wherein the control system is configured for co-depositing catalyst materials ~~are co-deposited in each layer~~ to form ternary alloys.

25. (currently amended) The system of claim 22 ~~having layers~~ wherein the control system is configured for co-depositing of alternating layers of ~~co-deposited~~ quaternary alloys.